Role of Spinal Diffusion Tensor Imaging in Predicting Postoperative Outcome in Cervical Degenerative Pathologies

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Introduction

Predicting post-operative recovery after surgery for cervical spondylotic myelopathy (CSM) is challenging. The authors performed a systematic review of the literature evaluating the diagnostic ability of DTI in CSM, and its ability to predict postoperative outcome.

Methods

A systematic PubMED search adherent to PRISMA guidelines included relevant clinical studies reporting use of DTI in adult humans undergoing operative management for CSM from 1980 onwards. Available data on preoperative clinical status and imaging and postoperative clinical outcomes were abstracted.

Results

Six of 562 studies were eligible for detailed review. There were 112 patients with CSM and 45 healthy controls. Seventy-three (59.8%) underwent operative management with mean follow-up time 269.9 (SD ±67.7) days. Fractional anisotropy (FA) was significantly lower in patients compared to controls across multiple studies, and correlated with pre-operative assessment (modified Japanese Outcome Assessment). FA and fiber tractography ratio (FTR) correlated with post-operative clinical assessments, with FA independently predicted surgical need and good outcome post-operatively.

Conclusions

DTI may be a valuable tool in diagnosing patients with CSM, identifying patients in need of surgical decompression, and predicting postoperative outcome. Future prospective studies are required for choosing optimal DTI parameters, anatomic levels and acquisition techniques.

Learning Objectives

By the conclusion of this session, participants should be able to describe the potential advantage of diffusion tensor imaging in diagnosing cervical spondylotic myelopathy over current clinical and radiographic diagnostic tools, and its potential for identifying operative candidates and predicting postoperative outcome.

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